REPEATED DIALING TOLL CONNECTORS
OPERATION TESTS
USING TOLL TRAIN AND COIN BOX TRUNK TEST SET ES-241636
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of performing operation tests on toll connectors except the level hunting type, and on combination connectors (toll side only) in repeated dialing toll trains, by means of wagon type toll train and coin box trunk test set ES-241636. It also indicates the key operation required in order to apply the readjust values of resistance to the ring-trip relays of connectors.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

1.03 The tests and the features tested are:

(A) Busy Line Test - Loop: This test checks the stepping features of a connector, its ability to return the proper busy signal and to release.

(B) Idle Line Test - Leak: This test checks the stepping features of a connector, also the ringing, pretrip, trip, transmission, supervisory, and release features. Eight-party semiselective connector ringing is indicated by (either test line bells or) visual signals on the test set.

(C) Ringing Polarity Test - 8-Party Semiselective Ringing Connectors: This test makes a complete check of toll connector H and J relays, and is intended for use only when testing a connector in connection with clearing a specific case of trouble. On a routine basis, the 8-party connectors should be tested as outlined under Tests (A) and (B).

1.04 The test line employed in making these tests is connected to terminal 99 except in the case of rotary hunting connectors, where terminal 99 is made busy and the test line is connected to terminal 90. The hunting feature of the switch is checked by directing the switch to terminal 99 and having it step to terminal 90.

1.05 The test line terminal is reached through the banks of a toll transmission selector by dialing the digit which will step the toll transmission selector to the level serving the connector to be tested and then dialing 99.

1.06 If the test set is equipped with the ST-T-SEL (step toll selector) key, the succeeding idle connectors of a group may be seized by momentarily operating this key to rotate the toll transmission selector to the next connector to be tested. In this case, it will be necessary to dial only 99 when testing succeeding connectors. With this method, it is desirable to perform either the busy line tests, or the idle line tests, on all connectors of a group at one time.

1.07 If the test set is not equipped with the ST-T-SEL key, it will be necessary to release the toll train switches, make the connector previously tested busy, and again dial the digit required to reach the next connector through the banks of the toll transmission selector before dialing 99.

1.08 A different toll transmission selector should be used on each routine test cycle so that eventually every selector will be tested in conjunction with each connector.

1.09 Lettered Steps: The letters, a, b, c, etc, are added to a step to indicate that the steps cover an action which may or may not be required, depending upon local conditions. The conditions upon which a lettered step or series of steps should be made are given in the ACTION column and all steps governed by the same condition are designated by the same letter. When a condition does not apply, the associated steps should be omitted.

1.10 The parentheses in Test (B), Steps 14, 15, etc, provide space for writing in the interval during which the pretrip and trip tests are to be made, as indicated in Table 1 or 2.

1.11 Toll Connectors: When testing toll connectors arranged for 1400-ohm or 1500-ohm maximum external subscriber loop, any ring-trip relay which fails on the pretrip or trip test (test set test resistance values) shall be readjusted mechanically and electrically to meet the requirements specified in Sections 040-803-701 and 040-236-701, and in the circuit requirement table. Repeat the tests. If the relay continues to fail, operate the test set keys as indicated for READJ in Table 2 to apply the test set readjust resistance values and again repeat the tests, changing the tension in No. 1 spring, as required.

1.12 Combination Connectors: There is magnetic interference between the ring-trip relay and the operated H relay of combination connectors. Due to this interference, when testing these connectors arranged for 1400-ohm or 1500-ohm maximum external subscriber loop:

(a) Pretrip: Any ring-trip relay which fails on the pretrip test shall be readjusted mechanically and electrically to meet the requirements specified in Sections 040-803-701 and 040-236-701, and in the circuit requirement table. The connector shall then be tested from the local side, and the ring-trip relay further readjusted, if necessary, to meet the pretrip and trip tests as covered in the section describing a method of performing operation tests on the local side of combination connectors. Make the trip test from the toll side.

(b) Trip: Any connectors which fail on the trip test shall be tested from the local side, and the ring-trip relay readjusted, if necessary, to meet the pretrip and trip tests as covered in the section describing a method of performing operation tests on the local side combination connectors. When the trip test is met from the local side, failure to trip during the silent period from the toll side is due to magnetic interference. In this case, tripping during the ringing period shall be considered sufficient.

Note: If the ring-trip relay was readjusted, and the connector tested from the local side following pretrip failure, it is not necessary to test the connector from the local side following trip failure.

1.13 When testing connectors arranged for 1000-ohm or 1115-ohm maximum external subscriber loop, which have a 60- or 75-volt silent interval tripping battery, and for which ac requirement are specified, any ring-trip relay, which fails on the pretrip or trip test (test set test resistance values) shall be readjusted to meet the requirements specified in Sections 040-803-701 and 040-236-701 and the readjust ringing current values provided by the trip set. These values are obtained by operating the test set keys as indicated for READJ in Table 1 or 2.

1.14 The test equipment specified in this section is designed to apply proper marginal tests (simulated critical circuit conditions) when the circuit under test and the test equipment have an applied voltage of 48.5 to 50. In those offices where power plants are normally operated at more than 50 volts, the battery voltage should be reduced and maintained within the required limits while the tests are being made.

2. APPARATUS

All Tests

2.01 Toll Train and Coin Box Trunk Test Set ES-241636.

2.02 P3H Cord, 10 feet long, equipped with one No. 310 Plug and one No. 240A Plug (3P2A Cord).

2.03 Four P3E Cords, 6 feet long, each equipped with two No. 310 Plugs (3P7A Cord).

2.04 52A Head Telephone Set.

2.05 No. 375A Tools (Make-Busy) (or equivalent) as required.

2.06 W1B Cord, 10 feet long, equipped with one No. 310 Plug, one KS-6780 Connecting Clip and one No. 108 Cord Tip (1W5A Cord).

2.07 Test Jack Circuit ES-241640.

Tests (B) and (C) For 8-Party Semiselective Ringing Connectors When Using Connector Test Line Circuit SD-31653-011

When Audible Ringing Signal Is Provided

2.08 No. 310 Plug designated "A" with tip, ring, and sleeve open.

2.09 No. 184B Plug designated "B".

2.10 No. 310 Plug designated "C" with tip and ring strapped.

Note: The designation "A", "B", or "C", as required, should be stamped locally on the shells of the above plugs.

When Visual Ringing Signal Is Provided

2.11 P3E Cord, 10 feet long, equipped with No. 310 Plugs (3P6F).

3. PREPARATION

STEP	ACTION	VERIFICATION
	All Tests	
	At Toll Transmission Selector Frame	
1	Connect test line jack No. 4 to test jack of a transmission selector associated with connector under test, using P3H cord.	
2a	If test set is equipped with ST-T-SEL key - Connect test line jack No. 1 to "A" terminal of the "C" network, or to No. 8 switch jack spring of toll transmission selector, using W1B cord.	
	At Connector Frame	
3	Connect test set jacks 1, 3, and 4 to test jack circuit jacks 1A, 3B, and 4B, respectively, using P3E cords.	
4	Connect operator telephone set to TEL jack of test set.	
5	Connect test set jack No. 2 to test jack circuit jack No. 2A, using P3E cord.	Lamps 2 and 4 light.
	Test (B) for 8-Party Semiselective Ringing Connectors when Using Connector Test Line Circuit SD-31653-011	
6b	If audible ringing signal is provided - Insert the "A", "B", or "C" plug into 8-PTY jack of test line using a different plug on each routine test cycle. Note: By using "A" plug, an operate test of H relay is applied; by using "B" plug, an operate test of J relay is applied; by using "C" plug, a nonoperate test of J relay is applied.	
7c	If visual ringing signal is provided - Operate H-O, J-O, J-NO key to one of the three positions, using a different position on each routine test cycle. Note: H-O position provides an operate test of H relay, J-O position provides an operate test of J relay, J-NO position provides an nonoperate test of J relay.	
	Tests(B) and (C) for 8-Party Semiselective Ringing Connectors when Using Connector Test Line Circuit SD-31653-011	
8c	If visual ringing signal is provided - Connect 8P jack of test set to 8-PTY jack of test line, using 10-foot P3E cord.	

4. METHOD

STEP	ACTION	VERIFICATION
	(A) Busy Line Test - Loop	
6	Operate BY key.	Lamp 3 lights.
7	Dial digits required to reach connector test line terminal. Note: When testing 10-party terminal per line connectors arranged for busy test of the called line following completion of code selector pulsing, it will be necessary to dial an extra digit following the test line number.	Lamp 2 extinguished while dial is off normal. Connector steps smoothly to ninth level and rotates smoothly to test line terminal.
8	Operate TALK key.	Lamp 2 extinguished. Busy tone heard in receiver. Note: In offices not arranged for intertoll dialing busy tone may not be heard.
9	Restore TALK key.	Lamp 2 lights.
10	Operate RING key momentarily.	Lamp 2 extinguished momentarily. Test set bell does not ring.
11	Restore BY key.	Lamp 3 extinguished.
12	Operate RING key momentarily.	Lamp 2 extinguished momentarily. Test set bell does not ring.
13a	If test set is equipped with ST-T-SEL key and succeeding switch in group is to be tested - Operate and restore ST-T-SEL key.	Connector releases. Lamps 2 and 4 extinguished and relighted when next idle connector seized.
14a	Repeat Steps 6 through 13a.	
15	Operate RLS key momentarily.	Connector releases. Lamps 2 and 4 extinguished momentarily.
16d	If test set is not equipped with ST-T-SEL key, and other connectors in group are to be tested - Make connector just tested busy.	
17d	Repeat Steps 6 through 12, 15, and 16d.	
18	Remove all test cords.	
19	Restore all keys.	
	(B) Idle Line Test - Leak	
9	Operate test set keys as indicated for TEST in Table 1 or 2 to provide proper pretrip or trip conditions in test set.	

STEP	ACTION	VERIFICATION

TABLE 1

KIND OF RING	MAX. EXT. SUB. LOOP (OHMS)	TRIP BATT. VOLTS	FOR		KEYS OPERATED				PRE TRIP	TRIP
					NOT USING FIG. L	USING FIG. L				
			TEST	READJ.	ADJ.	SS	TST	ADJ.		
AC-DC	1000-1115	46-50	X			X	X		RINGING PERIOD	SILENT PERIOD
SUPER-IMPOSED	1000-1115	46-50	X				X			
		60-75	X						RINGING PERIOD	RINGING PERIOD
				X	X			X		

TABLE 2

KIND OF RING	MAX. EXT. SUB. LOOP (OHMS)	TRIP BATT. VOLTS	FOR		KEYS OPERATED					PRE TRIP	TRIP
			TEST	READJ.	1000A	1000B	1400A	1400B	ADJ		
AC-DC and/or SUPER-IMPOSED	1000-1115	48.5-50	X		X					SILENT PERIOD	SILENT PERIOD
		60-75	X			X				RINGING PERIOD	RINGING PERIOD
				X		X			X		
	1400-1500	48.5-50	X				X			SILENT PERIOD	SILENT PERIOD
				X			X		X		
		66-75	X					X			
				X				X	X		

10d If testing 10-party terminal per line connectors -
Operate 10-PTY TPL key.

11e If testing 10-party terminal per station connectors -
Operate 10-PTY TPS key.

12f If testing 8-party connectors and not using connector test line SD-31653-01 -
Operate 8-PTY SS key.

Note: For tests during silent interval, the silent interval tripping battery shall be within the voltage limits shown in Table 1 or 2.

13 Operate TRK-LEAK key.

14 Dial digits required to reach connector test line terminal.

Note: When testing 10-party terminal per line connectors, dial an extra digit following test line number, to set the ringing code, using a different digit on each routine test cycle. Operate PTY RING key if a ring party code is to be dialed, or PTY TIP key if a tip party code is to be dialed.

Lamp 2 extinguished while dial is off normal. Connector steps smoothly to ninth level and rotates smoothly to test line terminal.
Lamps 1 and 3 light.

STEP	ACTION	VERIFICATION
Ringing Test		
15	Operate RING key momentarily.	Lamps 1 and 2 extinguished momentarily. Test set bell rings. Note: When testing 2-ring or code ringing connectors, check that first ring is a full code ring in order to check pick up feature.
16	Operate TALK key.	Lamps 1 and 2 extinguished. Audible ring heard in receiver. If connector test line SD-31653-01 with audible signal is provided and 8-party connectors are being tested - R-bell rings when A or C plug is used R+bell rings when B plug is used. If connector test line SD-31653-01 with visual ringing signal is provided and 8-party connectors are being tested - Lamp 6 flashes with H-O, J-NO, J-O key in H-O or J-NO position. Lamp 5 flashes with H-O, J-NO, J-O key in J-O position. If testing 8-party connectors and test line other than SD-31653-01 is used - - Bell or + Bell rings.
17	Remove plug from 8-PTY jack of test line.	Bells silenced or lamps extinguished.
18f	If testing 8-party connectors and not using connector test line circuit SD-31653-01 - Restore 8-PTY SS key.	
19	Restore TALK key.	Lamps 1 and 2 light.
Pretrip Test		
20	At start of ( ) interval, operate N- TR or PRETRIP key.	Test set bell continues to ring.
Trip Test		
21	At start of ( ) interval, operate TRIP or TRP-HIGH key.	Lamps 1 and 2 extinguished. Test set bell silenced.
Transmission Test		
22	Operate TALK key.	
23	Operate and restore TRS key several times.	Clicks heard in receiver.
24	Restore all keys.	

STEP	ACTION	VERIFICATION
25	Remove cords.	

(C) Ringing Polarity Test - 8-Party Semiselective Ringing Connectors

Audible Ringing Signal

9	Insert "A" plug into 8-PTY jack of test line.	
10	Dial digits required to reach connector test line terminal.	Lamp 2 extinguished while dial off normal. Lamps 1 and 3 light.
11	Operate RING key momentarily.	Lamps 1 and 2 extinguished momentarily. R- bell rings, follows ringing code.
12	Operate TALK key.	Lamps 1 and 2 extinguished. Audible ring heard in receiver.
13	Remove "A" plug from 8-PTY jack and insert "C" plug.	R- bell continues to ring.
14	Remove "C" plug from 8-PTY jack and insert "B" plug.	R- bell silenced. R+ bell rings, follows ringing code.
15	Restore TALK key.	Lamps 1 and 2 light.
16	Operate RLS key.	Lamps 1, 2, 3, and 4 extinguished.
17	Restore RLS key.	Lamps 2 and 4 light.
18	Remove "B" plug from 8-PTY jack.	
19	Restore all keys.	
20	Remove all cords.	Lamps 2 and 4 extinguished.

Visual Ringing Signal

21	Operate H-O, J-NO, J-O key to H-O position.	
22	Dial digits required to reach connector test line terminal.	Lamp 2 extinguished while dial is off normal. Lamps 1 and 3 light.
23	Operate RING key momentarily.	Lamps 1 and 2 extinguished momentarily. Lamp 6 flashes, follows ringing code.
24	Operate TALK key.	Lamps 1 and 2 extinguished. Audible ring heard in receiver.
25	Operate H-O, J-NO, J-O key to J-NO position.	Lamp 6 continues to follow ringing code.
26	Operate H-O, J-NO, J-O key to J-O position.	Lamp 6 extinguished. Lamp 5 flashes, follows ringing code.
27	Restore TALK key.	Lamps 1 and 2 light.

STEP	ACTION	VERIFICATION
28	Operate RLS key.	Lamp 5 extinguished. Lamps 1, 2, 3, and 4 extinguished.
29	Restore RLS key.	Lamps 2 and 4 light.
30	Restore all keys.	
31	Remove all cords.	Lamps 2 and 4 extinguished.